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Influence of depression and anxiety in Total Knee Arthroplasty outcomes in a Portuguese population

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CONTENTS

LIST OF ACRONYMS

HADS - The Hospital Anxiety And Depression Scale

KOOS – Knee Injury and Osteoarthritis Outcome Score

ADL - Activities of daily life (subscale of KOOS questionnaire)

QOL - Quality of life (subscale of KOOS questionnaire)

Sport/Rec - Sports and recreation (subscale of KOOS questionnaire)

PROMs – Patient reported outcome measures

OA - Osteoarthritis

TKA - Total Knee Arthroplasty

FIGURE AND TABLE LEGEND

KEY WORDS

Portugal; Outcomes; Anxiety, Depression; Total Knee Arthroplasty

RESUMO

Introdução

Globalmente, a prótese total de joelho (PTJ) é considerada umas das cirurgias melhor sucedidas e um dos tratamentos com melhor relação custo-benefício para graus avançados de osteoartrose do joelho. Além disso, a sua utilização tem vindo a aumentar. Sintomas pré operatórios de ansiedade e depressão estão incluídos nos factores de risco, descritos na literatura, para piores resultados da cirurgia do joelho. Este dois factores, podem ser tratados para otimizar o estado de saúde do doente, emergindo a dúvida se existirá benefício custo-efectivo em tratá-los previamente à realização da PTJ.

Métodos

Um estudo retrospectivo longitudinal foi realizado em pacientes que foram submetidos a PTJ unilateral para tratamento da osteoartrose do joelho. A amostra foi composta por todos os doentes inscritos para tratamento de osteoartrose do joelho no Hospital Santo António – Centro Hospitalar do Porto que tiveram a oportunidade de frequentar as consultas multidisciplinares pré-operatórias desde Junho de 2014 a Dezembro de 2015 e que responderam a todos os questionários.

Inicialmente, os doentes responderam ao primeiro questionário Knee Injury and Osteoarthritis Outcome Score (KOOS) e ao The hospital anxiety and depression scale (HADS) de forma individual. Posteriormente, 6 a 12 meses depois, um segundo questionário KOOS foi enviado através do correio. As respostas dos doentes foram arquivadas nos seus processos clínicos, até serem utilizadas para o desenvolvimento deste estudo.

Resultados

Níveis elevados de depressão pré-operatória medidos através do HADS foram associados a variações inferiores do resultado do KOOS na subescala de desporto e recriação. Nas restantes subescalas não foram verificadas relações, tanto para sintomas de depressão como de ansiedade.

Discussão

Embora em Portugal os estudos sobre esta temática sejam escassos, nos últimos 10 anos vários autores internacionais proposeram e debateram a implicação da ansiedade e depressão nos resultados da PTJ.

Este estudo concluiu que, quanto mais sintomas de depressão existiam pré operatoriamente, pior seria a evolução pós PTJ, repercutindo-se em menores valores nos resultados KOOS, em específico na subescala de desporto e recriação. Não foram verificadas diferenças significativas nas restantes subescalas do KOOS tanto relacionando-o com sintomas de ansiedade como de depressão. Ainda assim, é importante salientar que a amostra utilizada foi pequena, retirando algum poder estatístico ao estudo.

Conclusão

Em suma, este estudo sugere uma associação entre sintomas pré-operatórios de depressão e piores resultados nos resultados do KOOS pós PTJ. Resultados semelhantes foram encontrados em estudos relacionados mas de maior escala, não só na relação com a subescala de desporto e recriação mas sim como todas as outras do questionários KOOS.

Abstract

Introduction

Worldwide, total knee arthroplasty (TKA) is considered one of the most successful and cost-efficient treatments for end-stage knee osteoarthritis OA and its use in clinical practice is increasing. Pre-operative anxiety and depression symptoms are included in the risk factors for worse perceived outcome after knee surgery, by some literature. Being two factors upon which, one can act acutely in order to improve, there is the doubt whether it is cost effective to apply preventive mental health measures prior to the TKA or not.

Methods

A retrospective longitudinal study was completed of patients who underwent unilateral primary TKA for the treatment of OA of the knee. The sample was composed of all the patients enrolled in TKA treatment for OA of the knee in Hospital Santo António – Centro Hospitalar do Porto, which were able to attend the multidisciplinary group clinic appointments from June 2014 to December 2015 and answer all the questionnaires.

Initially patients answered the first KOOS and HADS questionnaire personally and individually. Afterwards, 6 to 12 months later, the second KOOS questionnaire was sent via post card. Responses were archived in each patient hospital record file and were later consulted to develop this study.

Results

Higher levels of depression pre-operation measured by the HADS scale were associated with inferior variation of scores on one KOOS questionnaire subscale, sports and recreation. There was not a significant difference in any of the other scores, both for depression and anxiety

Discussion

Even though there is a paucity of studies on this subject in Portugal, for over 10 years, different international authors have proposed and debated the implication of depression and anxiety on the outcomes of TKA.

On this study it was concluded that the more symptoms of depression one possesses prior to surgery, the less improvement will he notice after TKA, therefore reporting lower KOOS scores, specifically for the sports and recreation subscale. There was not a significant difference in any

of the other scores, both for depression and anxiety, however the sample used was small. Therefore the study lacks some statistical power.

Conclusion

In summary, this study suggests an association between pre-operation symptoms of depression and worse scores on KOOS after TKA. Similar results have been found on larger, related studies, not only linked with sports and recreation subscale but also with all parameters of the KOOS questionnaire.

1.0 INTRODUCTION

Global elderly population is increasing significantly and this tendency, as several authors claim, is shared among occidental countries, Portugal included[1]. In addition, in light of the current financial and demographic situation in Portugal, quality of health care has been affected[2, 3]. There are studies that state that one in each five portuguese aged 65 years or more is considered dependent[4] and that, multimorbidity has a high prevalence in the primary care context[3].

Depression is a common disease among elderly people and it mainly affects those with chronic medical illnesses and cognitive impairment, causing suffering, family disruption, and disability, worsening the outcomes of many medical illnesses, and increasing mortality[5]. Throughout these direct and indirect impacts in other pathologies, it is easier to understand the motives behind the growing interest of this problem within the scientific class. Nowadays, there are even studies that advocate routine depression screening among general population, in order to prevent prejudicial future effects on health[6].

Nevertheless, diagnosis of mental health issues can be challenging, so The Hospital Anxiety And Depression Scale (HADS) was a questionnaire designed to aid the clinician to recognize emotional components of physical illness as a simple yet reliable screening tool for anxiety and depression in a general hospital setting[7, 8].

Knee osteoarthritis (OA), a common disorder that causes pain and disability to an increasing fraction of the population, correlates strongly with aging and moderately with comorbid conditions such as depression[9]. It is also the main indication for total knee arthroplasy[10], therefore there is now more than ever in Portugal, the need to upgrade the efficiency of this procedure .

In the US 12% of adults are affected with knee OA. In Portugal, the numbers are similar. About 8 to 12% of population (older than 45 years) suffers from OA and half of those cases are exclusively knee related[11]. There is statistical evidence that Portugal is one of the countries where TKA has been increasingly performed. From 1997 to 2008, there was an compound annual growth of 17%[12].

Knee OA has a variable prognosis. Once present, improvement of joint structure is rare when assessed by radiography, but reduction of joint pain and disability occurs frequently[13]. The treatment contemplates alleviation of pain and improvement of functional status by non-pharmacological measures such as patient education, activity modification, weight loss, pharmacological measures such as over the counter analgesics and surgical procedures such as total knee arthroplasty (TKA) and unicompartmental knee arthroplasty.

Worldwide, TKA is considered one of the most successful and cost-efficient treatments for end stage knee OA and its use in clinical practice is increasing[14], as the doubled annual rate of total knee replacement (especially in those aged 45-64) in the United States of America (USA) since 2000, proves[13]. However, there is still room for improvement, since around 15% of patients report dissatisfaction [15-17].

Pre-operative anxiety and depression symptoms are included by many in the risk factors for worst perceived outcome after knee surgery[18-21], even though some literature states otherwise[22]. Being two factors upon which, one can act acutely in order to improve, there is the doubt whether it is cost effective to apply preventive mental health measures prior to the TKA or not[20, 23].

Outcomes can be measure by PROMs, acronym for patient-reported outcome measures, which importance as a tool to assess the quality of care delivered to patients from the patient perspective, is gradually being reckoned by scientific articles[24].

The Knee injury and Osteoarthritis Outcome Score (KOOS) is a patient-reported outcome measurement instrument developed in 1995 in the USA as an extension of the Western Ontario and McMaster Universities Osteoarthritis Index, also known as WOMAC. The main purpose was evaluating short and long-term symptoms (thereby eliminating some of the previous scores flaws) and function in subjects with knee injury and osteoarthritis [25-27].

2.0 METHODS

A retrospective longitudinal study was completed of patients who underwent unilateral primary TKA for the treatment of OA of the knee. The main subjects of the study were the patient outcomes of the surgery (in their own perspective) and symptoms of depression and anxiety. The first parameter was measured by a PROM questionnaire – KOOS – and the second one, by HADS, a self-assessment scale.

The patients filled both the questionnaires pre-operation and the KOOS questionnaire 6 to 12 months later. The responses were archived in their clinical file, and were later consulted for the purpose of developing this study.

2.1 Patients

The sample was composed of all the patients enrolled in TKA treatment for OA of the knee in Hospital Santo António – Centro Hospitalar do Porto, which were able to attend the multidisciplinary group clinic appointments from June 2014 to December 2015.

The data was collected from each patient clinical file.

Initially 200 patients answered the first KOOS questionnaire, but only half of them were also able to answer the HADS questionnaire, since it was only introduced afterwards in the routine procedure of multidisciplinary group clinic appointments. 80 patients replied and returned the second KOOS questionnaire.

Analyzing all the filled out questionnaires, only the patients that had answered all 3 of them, were made eligible to the study. The final sample number was 33 patients.

The exclusion criteria was therefore composed by these items: patients that did not attend the multidisciplinary group clinic appointments; patients that did not reply to all the surveys; patients that did not fill correctly at least one of the surveys.

The study was examined and accepted by the Gabinete Coordenador de Investigação do Departamento de Ensino, Formação e Investigação (DEFI) with the

reference number of 2016.242(205-DEFI/194-CES), the hospital's ethics committee, the hospital's board of administration and the hospital’s clinical board.

Patients	Gender	Age	POST - PRE OP: KOOS Pain	POST - PRE OP: KOOS Symptom	POST - PRE OP: KOOS ADL	POST - PRE OP: KOOS Sport/Rec	POST - PRE OP: KOOS QOL	HADS Score Anxiety	HADS Score Depression
1	Masculine	56	75-42= **33**	57-43= 14	65-49=16	0-15= -15	0-31= -31**	9	9
2	Masculine	65	75-33= **42**	61-32= 29	71-31= **40**	20-0 = 20	69-0= **69**	12	8
3	Feminine	74	64-31=**33**	50-36=14	43-26= 17	15-0= 10	38-19= 19	13	6
4	Masculine	61	50-44=6	57-29= 28	75-44= 31	50-35= 15	63-38= 25	11	10
5	Feminine	68	56-44=12	54-57= -3**	62-54= 8	100-10= **90**	63-6= **57**	9	7
6	Masculine	68	97-36= **61**	54-43= 9	63-19= **44**	15-0= 15	31-19= 12	10	12
7	Masculine	80	81-64= 17	54-54= 0	72-57= 15	20-45= -25**	25-56= -31**	13	8
8	Masculine	68	92-50= 42	54-61= -7**	64-49 = 15	50-20= **30**	75-56= 19	12	6
9	Masculine	69	53-53= 0	57-57=0	38-47= -9	0-25= -25**	38-25= 13	14	11
10	Masculine	58	92-39= **53**	82-71= 11	95-34= **61**	85-0= **80**	50-13= **37**	10	9
11	Feminine	70	100-31= **69**	57-43= 14	99-35= **64**	81-0= 0	81-19= **62**	12	6
12	Feminine	74	56-44=12	50-36= 14	40-53= -13**	0-0= 0	19-50= -31**	10	11
13	Feminine	77	92-19=**71**	71-57= 14	78-21= **57**	25-0 = 25	44-6= **38**	12	10
14	Feminine	75	72-53=19	61-46= 15	51-37= 14	0-0= 0	50-19= **31**	8	6
15	Feminine	65	8-50= -42**	0-21= -21**	15-72= -57**	100-100= 0	6-25= -19**	11	7
16	Feminine	62	72-42= **30**	50-50= 0	69-35= **34**	10-5= 5	81-19= **62**	14	6
17	Masculine	79	89-39= **50**	79-50= 19	71-34= **37**	10-25= -15**	69-25= **44**	11	12
18	Feminine	80	100-36=**64**	71-25= **46**	100-13= **87**	Not valid	100-6= **94**	15	8
19	Feminine	70	53-42=11	36-50= -14**	53-44= 9	80-0= **80**	69-44= 25	8	7
20	Feminine	87	36-58= -22**	10-57= -47**	Not valid	Not valid	Not valid	11	9
21	Feminine	61	75-42= **33**	64-64= 0	59-35= 24	0-0= 0	25-13= 12	10	8
22	Masculine	67	100-56= **44**	61-29= **32**	100-51= **49**	75-20= **55**	81-19= **62**	15	8
23	Masculine	59	61-31= **30**	43-29= 14	59-37= 22	30-5= 25	31-19= 12	13	7
24	Feminine	77	100-64= **36**	63-64= -1**	73-28= **45**	5-0= 5	44-31= 13	12	7
25	Feminine	73	44-36= 8	21-54 = - 33**	35-46= -11**	30-10= 20	19-25= -6	11	8
26	Feminine	77	81-39= **42**	46-36= 10	57-12= **45**	30-0= **30**	44-0 = **44**	11	10
27	Feminine	60	53-11= **42**	36-57= -21**	49-19= **30**	25-95= -75**	44-0 = **44**	12	10
28	Feminine	65	50-47= 3	29-46= -17**	60-81= -21**	100-100= 0	19-31= -12**	9	15
29	Masculine	72	67-50= 17	43-39= 4	44-49= -5**	15-25= -10**	25-25= 0	10	12
30	Feminine	60	81-36= **45**	54-50= 4	43-25= 18	0-5= -5**	0-13= -13**	4	8
31	Feminine	73	67-31= **36**	61-50= 11	54-31= 23	5-0= 5	50-31= 19	10	9
32	Feminine	64	42-39= 3	25-32= -7**	53-41= 12	10-100= -90**	6-19= -13**	10	9
33	Feminine	76	61-50 = 11	54-57= -3**	63-44= 19	Not valid	50-6= **44**	10	9

Table I - Patients sample demographics, HADS and KOOS scores.

2.2 Measurements

The responses of both HADS and KOOS pre-operation were gathered and examined. Patients taking part in the multidisciplinary group clinic appointments responded there to the surveys, personally and individually. Both surveys are self-administered, auto-explanatory and are estimated to be completed in about 10 minutes[7, 28].

After this initial sample data was assembled, patients were contacted by telephone 6 to 12 months after their surgery. This contact was made in order to increase response rate. Then, KOOS questionnaires were sent via post card to each patient in an envelope, which also contained another one, destined to be sent back without any costs.

The answers to the questionnaires were evaluated by the clinician in charge and afterwards stored in the patient's personal hospital record, along with the surgery information.

The number of patients that qualified for the study, by answering validly to all 3 questionnaires, was 33.

The HADS questionnaire consists of 14 simple questions, half of those related to anxiety symptoms and the other half to depressive symptoms. Each item is coded from 0 to 3, using a four point Likert scale. The scores for anxiety and depression can therefore vary from 0 to 21, depending on the presence and severity of the symptoms. They can be summed for each subscale separately or cut-off points/thresholds that have been proposed and defined by several authors can be used[29]: a score between 0 and 7 does not indicate the presence of any symptoms; a score between 8 and 10 indicates the presence of the light symptomology, a score greater than or equal to 11 indicates a significant number of symptoms of anxiety or depression corresponding to clinical evident cases; finally there is a distinction between moderate (11-14) and severe cases (15-21). The application of this questionnaire is acceptable in Portugal since it's been validated for the Portuguese population and adapted for its culture[7, 8].

KOOS questionnaires are comprised of 42 question, included in five subscales: pain (9 items), symptoms (7 items), functioning in activities of daily living (ADL, 17 items), functioning in sport and recreation (5 items), and knee-related Quality of Life

(QoL, 4 items). Standardized response options are given (5-point Likert scale), and each question is scored from 0 to 4. Then, a normalized score from 0 to 100 is calculated for each subscale (100 indicating no symptoms and 0 indicating extreme symptoms). They have been validated to apply from young to old age in several countries including Portugal[26-28].

As a final point, the patient's data was accessed through their hospital record file and the variables collected included: age, gender, HADS and KOOS responses. The scores for both surveys were later calculated according to the rules in the appropriate literature[28, 29]. Statistical analysis was further completed using predictive analytics software.

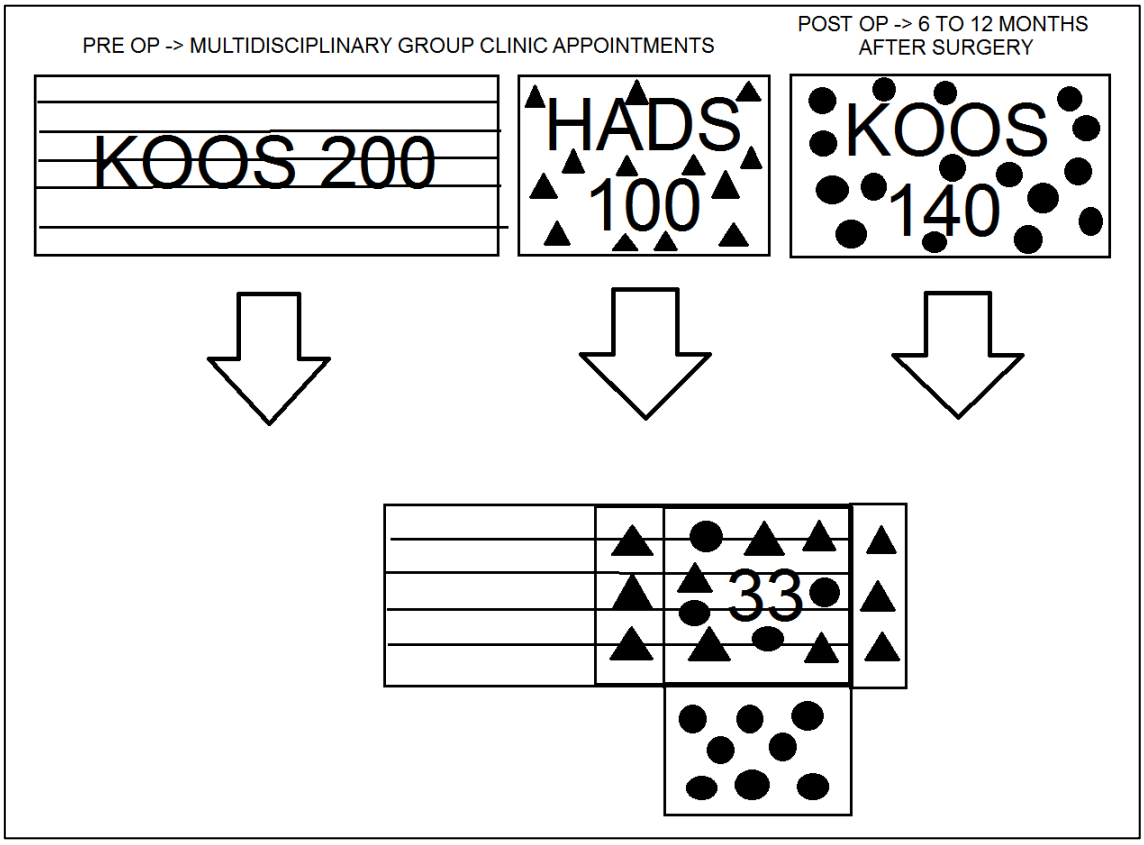

Figure I - Portraying the selection of available patients to the study. Final sample number = 33.

2.3 Statistical analysis

Data is presented by mean and standard deviation, in the case of quantitative variables, proportions in the case of categorical variables, Normality was assessed by the Kolmogorov-Smirnov test. Comparisons were made by the t-test or non parametric Mann Whitney. Contingency tables crossing categorical variables were analyzed by the Chi-square test or the Fisher´s exact test. Correlations were studied by the Pearson or Spearman correlation coefficients. Data was analyzed using IBM SPSS Statistics V24, and significance was assumed for $p<0.05$.

3.0 RESULTS

3.1 Demographics

The sample was composed of 33 patients, recruited from Hospital Santo António – Centro Hospitalar do Porto, with age ranging from 56 to 87 years old, with a mean of 69.39. 21 were female (63.64 %) and 12 were male (36.36%). Table 2 resumes the overall demographics and descriptive HADS and KOOS values.

3.2 Age and gender influence?

Chi-square tests were applied and there was no evidence of statistical difference in both questionnaires (KOOS and HADS) when the variables age (categorized in classes) and gender were studied.

3.3 KOOS scores

KOOS subscales values pre-operation were rated 41.84 for the pain item, 46.21 for the symptoms item, 39.40 for the activities of daily life item, 19.55 for the sports and recreation item and 22.35 for the quality of life item. The symptoms subscale had the

higher score and the sports and recreation subscale had the lowest, representing, respectively, the best and worst knee condition before surgery, according to the patient's point of view.

Concerning post-surgery data, all KOOS subscales varied positively. The mean value of the score posterior to the TKA was always higher than the mean value prior to the operation, which means there was a slight positive evolution in the mean.

KOOS subscales post-operation were rated 69.44 for the pain item, 50.36 for the symptoms item, 61.65 for the activities of daily life item, 32.88 for the sports and recreation item and 43.95 for the quality of life item.

Calculating the mean difference between KOOS scores post-surgery minus pre-surgery, we obtained the following data: regarding the pain subscale the difference mean value was 27.61, as for the symptoms subscale was 4.15, for the activities of daily life subscale was 22.49, for the sports and recreation subscale was 11.38, finally for the quality of life subscale was 21.88. This data can be consulted in table 2.

3.4 HADS scale

HADS scores evaluated pre-operation, were calculated in two different forms. First, the raw values for anxiety symptoms, which ranged from 4 to 15 out of 21. The mean value was 10.97. As for the raw values for depression symptoms, they varied between 6 and 15. The mean value was 8.73.

Secondly, subscales were created, using the cut-off points described in the literature (0-7 represents no symptoms, 8-10 light symptomology, 11-14 mild symptomology and 15-21 severe symptomology). Values above 11 indicate clinical evident symptoms.

The prevalence of clinical evident symptoms of anxiety was 57.58%. However, up to 96.97% of the total sample exhibited at least minor symptoms.

In relation to symptoms of depression, the prevalence for clinical evident symptoms was lower, 18.18%. Yet also a high number of patients exhibited at least minor symptoms, more precisely 72.73% of the total sample.

3.5 Comparison of KOOS scores subscales and the post-operation KOOS scores

A paired-samples t-test was conducted to compare the pre-operation KOOS scores subscales and the post-operation KOOS scores subscales. There was a significant difference in the scores for the quality of life subscale pre-operation (M= 22.07, SD= 15.06) and quality of life subscale post-operation (M= 43.95, SD= 26.06, $t(31)= -3.89$, $p < 0.05$). There was also a significant difference in the scores for the pain subscale pre-operation (M= 41.84, SD= 11.43) and pain subscale post-operation (M= 69.44, SD= 21.83, $t(32)= -6.27$, $p < 0.05$). Lastly, a significant difference in the scores for the activities of daily life subscale pre-operation (M= 39.15, SD= 15.54) and activities of daily life subscale post-operation (M= 61.65, SD= 19.54, $t(31)= - 4.52$, $p < 0.05$) was found.

3.6 Inter-scales correlation

Both Spearman and Pearson correlation coefficients were used to calculate some level of correlation between some subscales. There were positive results between the pair Pain vs Symptoms, Pain vs Sports and recreation, Pain vs activities of daily life, Symptoms vs Sports and recreation, Symptoms vs Activities of daily life and, activities of daily life vs quality of life.

Pain vs Symptoms: There was a positive correlation between the two variables, $r = 0.80$, $n = 33$, $p < 0.05$.

Pain vs Sports and recreation: There was a negative correlation between the two variables, $r = -0.53$, $n = 33$, $p < 0.05$.

Pain vs activities of daily life: There was a positive correlation between the two variables, $r = 0.77$, $n = 33$, $p < 0.05$.

Symptoms vs Sports and recreation: There was a positive correlation between the two variables, $r = -0.54$, $n = 33$, $p < 0.05$.

Symptoms vs Activities of daily life: There was a positive correlation between the two variables, $r = 0.69$, $n = 33$, $p < 0.05$.

Activities of daily life vs quality of life: There was a positive correlation between the two variables, $r = 0.66$, $n = 33$, $p < 0.05$.

3.7 Influence of pre-operation anxiety and depression on PROMs?

Higher levels of depression pre-operation, measured by the HADS scale, were associated with inferior variation of scores on one KOOS questionnaire subscale, sports and recreation. Independent T tests were employed to compare the data. Difference between KOOS scores post-surgery and pre-surgery was calculated and thresholds were applied according to literature, dividing the sample population in two groups: one with no symptoms of depression and another with any symptoms of depression. Threshold selected was equal or greater than 8, and smaller than 8, on HADS scale.

There was a significant difference in the scores for patients with none symptoms of depression ($M= 11.92$, $SD=48.80$) and patients with any symptoms of depression ($M=10.96$, $SD= 33.71$, $t(28)= -.064$, $p > 0.05$).

There was not a significant difference in any of the other scores, both for depression and anxiety. Further data can be consulted in tables 3 and 4. Concerning the anxiety symptoms, there was a different form of division to form the two groups: one without clinical evident symptoms of anxiety and other with clinical evident symptoms of anxiety. Threshold selected was equal or greater than 11, and smaller than 11, on HADS scale.

	Masculine sex	Feminine sex	Any symptoms of depression or anxiety	Clinical evident symptoms of depression or anxiety	Difference between post and pre-operation KOOS scores
Sample = 33 patients	36.36% (12)	63.64 % (21)	Depression 72.73% (24) Anxiety 96.97% (32)	Depression 18.18% (6) Anxiety 57.58% (19)	ADL = 22.49 QOL = 21.88 Pain = 27.61 Symptoms = 4.15 Sports and Rec = 11.38

Table II - Overall demographics and descriptive HADS and KOOS values.

ANXIETY	Descriptive data using thresholds	Statistical Difference between the 2 groups	Independent T test
Activities of Daily life	*HADS score < 11 =* 14 patients *HADS score >= 11 =* 18 patients	No	There was not a significant difference in the scores: t (30)=1.34, p = 0.19
Quality of life	*HADS score < 11 =* 14 patients *HADS score >= 11 =* 18 patients	No	There was not a significant difference in the scores: t (30)=1.98, p = 0.057
Pain	*HADS score < 11 =* 14 patients *HADS score >= 11 =* 19 patients	No	There was not a significant difference in the scores: t (31)=0.54, p = 0.59
Symptoms	*HADS score < 11 =* 14 patients *HADS score >= 11 =* 19 patients	No	There was not a significant difference in the scores: t (31)=0.40, p = 0.69
Sports and recreation	*HADS score < 11 =* 13 patients *HADS score >= 11 =* 17 patients	No	There was a significant difference in the scores: t (28)=-0.06, p = 0.95

Table III – Influence of pre-operation anxiety symptoms on KOOS scores.

DEPRESSION	Descriptive data using thresholds	Statistical Difference between the 2 groups	Independent T test
Activities of Daily life	*HADS score < 8 =* 10 patients *HADS score >= 8 =* 22 patients	No	There was not a significant difference in the scores: t (30)=0.74, p = 0.47
Quality of life	*HADS score < 8 =* 10 patients *HADS score >= 8 =* 22 patients	No	There was not a significant difference in the scores: t (30)=-0.74, p = 0.46
Pain	*HADS score < 8 =* 10 patients *HADS score >= 8 =* 23 patients	No	There was not a significant difference in the scores: t (31)=0.51, p = 0.61
Symptoms	*HADS score < 8 =* 10 patients *HADS score >= 8 =* 23 patients	No	There was not a significant difference in the scores: t (31)=0.64, p = 0.53
Sports and recreation	*HADS score < 8 =* 10 patients *HADS score >= 8 =* 20 patients	**Yes**	There was a significant difference in the scores: t (28)=-2.18, p = 0.038

Table IV - Influence of pre-operation depression symptoms on KOOS scores.

4.0 DISCUSSION

Not only physical problems may affect outcomes after surgery, mental health issues and social background have also been indicated as risk factors [30-32]. Yilmaz et al (2015)[33] have successfully propose the use of Alprazolam on comorbid pain and knee functions in TKA patients diagnosed with anxiety and depression, establishing the work by the same premise written above.

Even though there is a paucity of studies on this subject in Portugal, for over 10 years, different international authors have proposed and debated the implication of depression and anxiety on the outcomes of TKA. Lingard and Riddle (2007)[34] showed impact of pre-operation distress on post-operation PROMs. Brander et al (2007)[35] followed a sample of 80 patients for a period of 5 years and related an association between depression and worst scores on PROMs but did not verify the same relation with anxiety. Scott et al (2010)[16] found depression and a poor mental health score to be independently significant predictors of dissatisfaction. It was suggested in the study, investigation and treatment of depressive symptoms by appropriate clinicians before surgery. Hanusch et al (2014)[36] study show that functional outcome after TKA can be significantly influenced by psychological factors. Other recent similar studies achieved the same conclusions[20, 21].

The scientific evidence is strong about this issue, however it must be considered that different studies use different measur7ing scales or questionnaires which can influence results and confound comparisons.

4.1 Demographics

In relation to simple demographics, the results matched the expected according to the literature, both in age[9, 37] and gender. The mean age of the sample was 69.39 years old. The majority of patients who undergo TKA are female, which corroborates with the value of 63.6% found in this study. Also, the ratio male:female is comparable to what is described in other literature of this subject[9, 12, 38].

4.2 About the Methods

The possibility of attending the multidisciplinary group clinic appointments was dependent on the distance to the Hospital. The presence of patients that live far away and/or have difficulties in terms of transportation, whether it is due to finance or mobility problems, was not required.

Besides, the mentioned exclusion criteria, some patients may have not been able to fully understand the questionnaire, that being the reason they were not qualified for the study. Either by, not responding the questions or responding to them in an inadequate form. Since illiteracy is associated with poorer health outcomes[39], one can presume the results of the study could be different if there was another method to assess PROMs.

In relation to the independent t test groups forming, it would be advised use the same cut off. However, that could not be done because the prevalence of anxiety symptoms (HADS score >=7) was so high that the sample would be unevenly divided (1 people in one group and 32 in another), losing any possible value on statistical analysis.

4.3 KOOS Scores

KOOS scores pre-operation vary between studies but are in the majority of times inferior to 70 out of 100[19, 40, 41]. There is not a starting point defined where patients qualify for surgery, because that is not the purpose of the questionnaire. Nevertheless, all the values found in the several subscales were favorable to what was expected. (41.84 for the pain item, 46.21 for the symptoms item, 39.40 for the activities of daily life item, 19.55 for the sports and recreation item and 22.35 for the quality of life item)[40, 42].

4.4 Inter-scale correlation

The inter-scale correlations followed a linear distribution and proved that there was some relation between some of the scales. Worse outcomes in the pain subscale correlated with worse outcomes in the symptoms subscale, for example. However that is not a subject explored in other similar studies since there is not a clinical application to this information.

4.5 HADS Scores

The values obtained for the HADS score were higher than the majority descriptions on other studies, inclusively studies of the same subject, such as Duivenvoorden et al. (2013) and Utrillas et al. (2014). Mean value for depression was 10.97 and for anxiety 8.73. 72.73% and 96.97% of the sample had at least light symptomology of depression and anxiety, respectively. The prevalence of clinical evident symptoms was lower, 18.18% and 57.585, also respectively for depression and

anxiety. Blackburn et al. (2011) with a 40 patient sample had greater values of pre-operation anxiety and depression scores, the mean was 11.9.

HADS presents scores for symptoms, so it overestimates the prevalence of anxiety or depression, because not all the patients that present symptoms may in fact fulfill the criteria for the diagnosis.

The present study almost doubles the values of HADS scores compared to the general population. These reference HADS scores have been calculated in several countries. The mean value for HADS score anxiety in general population of Colombia is 4.6[43], similar to Germany which is 4.7[44] and Sweden that is 4.5[45]. Korea with 5.3[46] and United Kingdom with 6.4[47] had greater scores. Concerning depression symptoms, Colombia revealed the value of 4.3[43], similarly United Kingdom had 3.7[47] and Sweden, 4.0[45]. Germany with 4.7[44] and Korea with 6.0[46] had the biggest numbers.

Even compared with chronic diseases scores, such as diabetes (28% of the 99 patients sample, presented with at least light symptomology of anxiety, depression or both[48]), chronic pulmonary obstructive disease (mean values for anxiety of 7.5 and 7.4 for depression in HADS scales in 419 patients[49]) and cancer (30% for any symptoms of anxiety and 24% for depression in 270 portuguese patients[50, 51]), patients enrolled in TKA treatment in this study had more anxiety and depressive symptoms. Regardless of this fact, only one subscale (sports and recreation) was revealed to be influenced by this prior state of low mental health in this study.

4.6 Influence of pre operation anxiety and depression on PROMs?

Findings of the current study support the premise of anxiety and depression influencing the outcomes of TKA[18-21]. Higher levels of depression pre-operation measured by the HADS scale were associated with inferior variation of scores on one KOOS questionnaire subscale, sports and recreation. Meaning that, the more symptoms of depression one possesses prior to surgery, the less evolution will he feel after TKA, therefore reporting lower KOOS scores.

On the other hand, with all the other subscales it was not suggested any association with both anxiety and depression. Blackburn et al. (2011) stated that preoperative anxiety and depression do not predict poor outcome after TKA. However, it included a small sample (40 patients), similarly to what happened in this study. Riddle

et al (2010) presented on their study conclusions that no psychologic predictors were associated consistently with poor PROM outcome.

With regard to the above mentioned, it can be concluded that, despite the actual evidence about the influence of depression and anxiety in TKA outcomes[52], there is still no consensus and work to be done, in order to turn this theoretical knowledge into clinical practice.

4.7 Strengths and weaknesses

The main weakness of this study was that it was conducted with a small sample of patients, which limited the conclusions that could be taken. The small number of participants decreases the value of the assumptions.

Also, the study design, being a retrospective study of collected data, carries some possible bias.

Comparing to other literature, some of the addressed studies had different exclusion criteria. Resulting in prejudice in portraying the standard TKA patient. This study only selected patients by their possibility of answering the questionnaires. Therefore, regardless of the sample number, it tried to remain pure to the “average” patient.

No conflict of interests was found.

4.8 Recommendations

It is advised to study this question with a larger sample. Also, it would be interesting to increase the data available, for example, also distributing the HADS questionnaire after the TKA, which would create new possibilities of questions to be asked, work to be developed and conclusions to be taken.

5.0 CONCLUSION

In summary, this study suggests an association between pre-operation symptoms of depression and worst scores on KOOS after TKA. Similar results have been found on larger, related studies. In fact, there is a suggestion along various authors that general outcomes are influenced by pre-surgery symptoms of both depression and anxiety.

Since these symptoms can be treated acutely it is important to study the cost-effectiveness of such treatments prior to TKA and it's influence on the outcomes. In particularly, in Portugal, where there is a paucity of Portuguese studies on this matter.

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